Advanced sub-seasonal and seasonal climate forecasts for adaptation

Núria Pérez-Zanón
Researcher
Barcelona Supercomputing Center

VitiGEOSS has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

What do we see?

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

EU GREEN WEEK
PARTNER EVENT

VITIGEOSS

FRANCE 24

LIVE

#WAR IN UKRAINE | #2022FRENCHELECTIONS | FRANCE | AFRICA | CULTURE | SHOWS | FIGHT THE FAKE

French wine production faces lowest output in decades after cold spells, heavy rains

Issued on: 06/08/2021 - 12:07

French vineyards have been severely hit by this spring's freezing temperatures, followed by heavy downpours this summer. © Clotaire Achi, REUTERS

ZURICH

How does climate change affect wine?

Sustainability | Article | July 16, 2021 | 6 min read

Wine grapes are highly sensitive to changes in climate. So how will the future of the wine industry be impacted by global warming?

By Sean McAllister

Share this

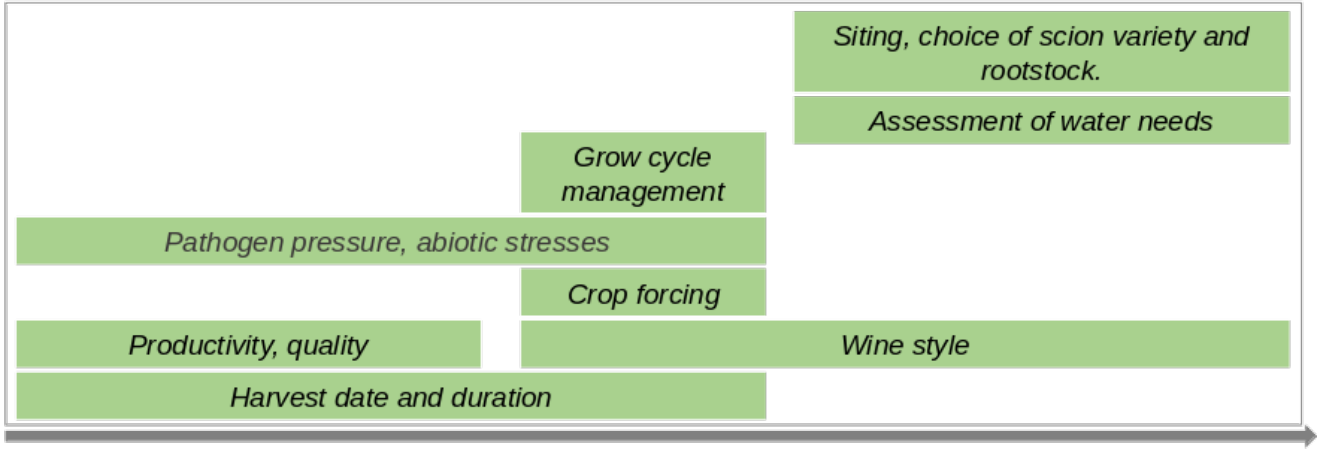
Climate is both friend and foe to the winemaking industry. The 'terroir', or geology, landscape, soil and, most importantly, the temperature, determine what grape varieties can be grown as well as shaping the quality and yield of the harvest. When the climatic conditions are good, then you can expect a great vintage.

BSC Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Weather forecasts vs Climate predictions

Weather forecast	Climate predictions			Climate projections
	Sub-seasonal	Seasonal	Decadal	
1-15 days	10-60 days	1-15 months	2-30 years	20-100 years



Adapted from: Antonio Graça, SOGRAPE VINHOS SA, 2014

EU GREEN WEEK
PARTNER EVENT

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Weather and Climate forecast Service

BSC's task is to provide the VitiGEOSS weather and climate service:

- Weather forecasts (1 -3 days)
- Sub-seasonal forecasts (4 weeks)
- Seasonal forecasts (3 months)

The target regions correspond to the vineyard plots of the wine producers in the project:

- Campania region (MASTROBERARDINO)
- Douro Valley (SYMINGTON)
- Catalonia (TORRES)

EU GREEN WEEK
PARTNER EVENT

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Weather forecasts

EU GREEN WEEK
PARTNER EVENT

Select Forecast

↓

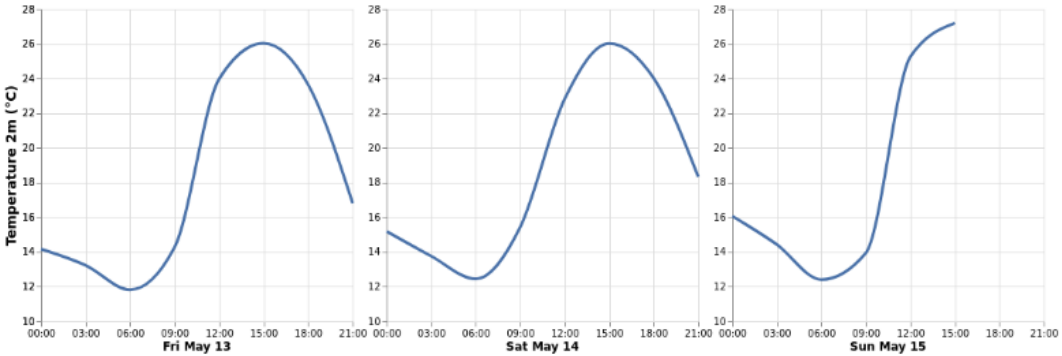
Select the site

↓

Select the variable

Temperature
Maximum temperature
Minimum temperature
Relative humidity
Shortwave radiation
Precipitation
Wind speed

Weather Forecast



- 3-hourly temporal evolution for today, tomorrow and half-day of the day after tomorrow
- daily updated

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Subseasonal forecasts

Select Forecast

↓

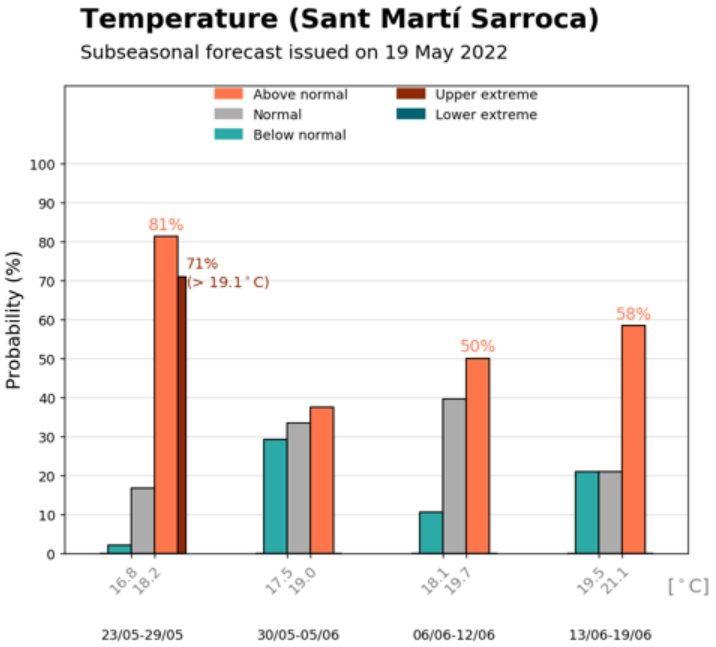
Select the site

↓

Select the variable

Temperature
Shortwave radiation
Precipitation

Subseasonal Forecast



Weekly forecast

Up to the next 4 weeks

Weekly updated

EU GREEN WEEK
PARTNER EVENT

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Seasonal forecasts

EU GREEN WEEK
PARTNER EVENT

Select Forecast

↓

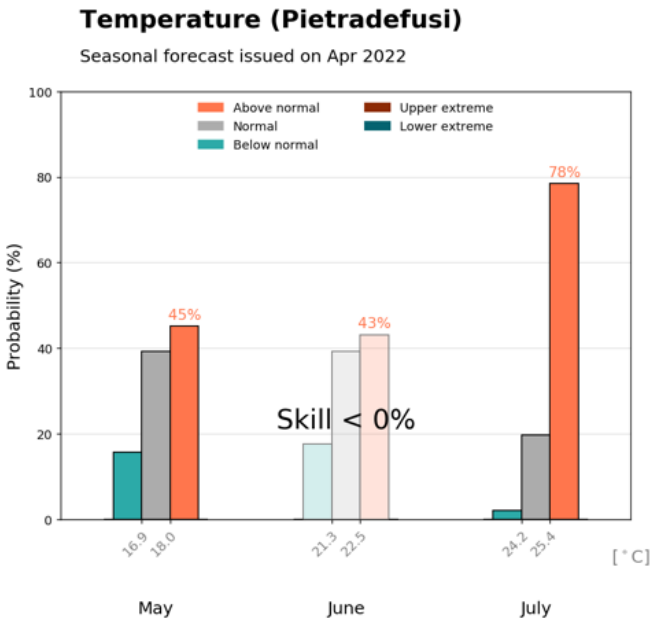
Select the site

↓

Select the variable

Temperature
Shortwave radiation
Precipitation

Seasonal Forecast



Monthly forecast

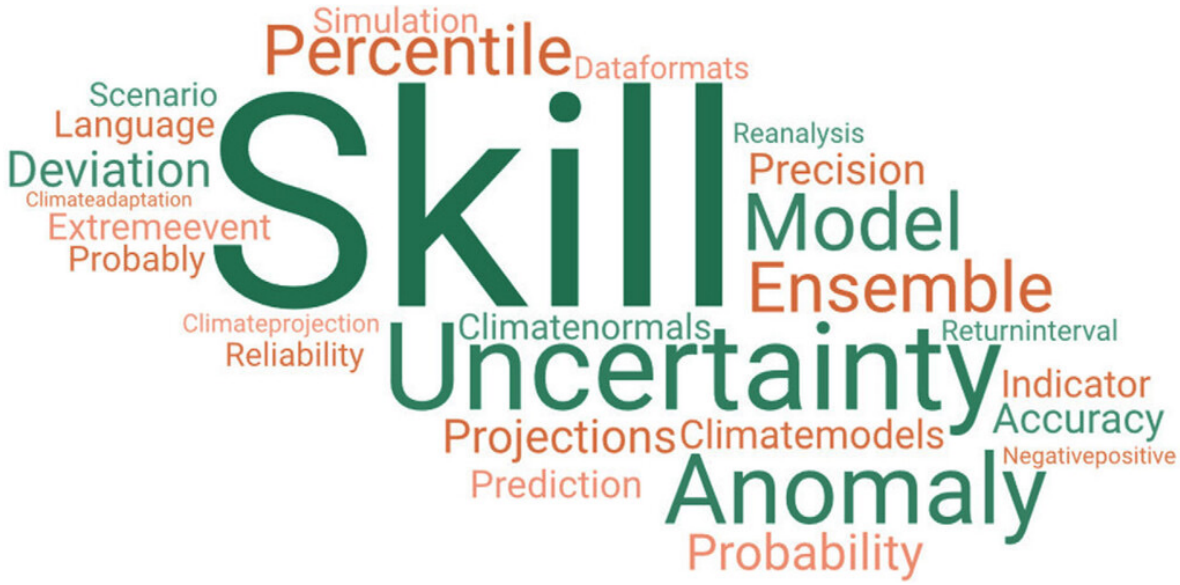
Up to the next 3 months

Monthly updated

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

EU GREEN WEEK
PARTNER EVENT



Word cloud from **Terrado et al., 2020**

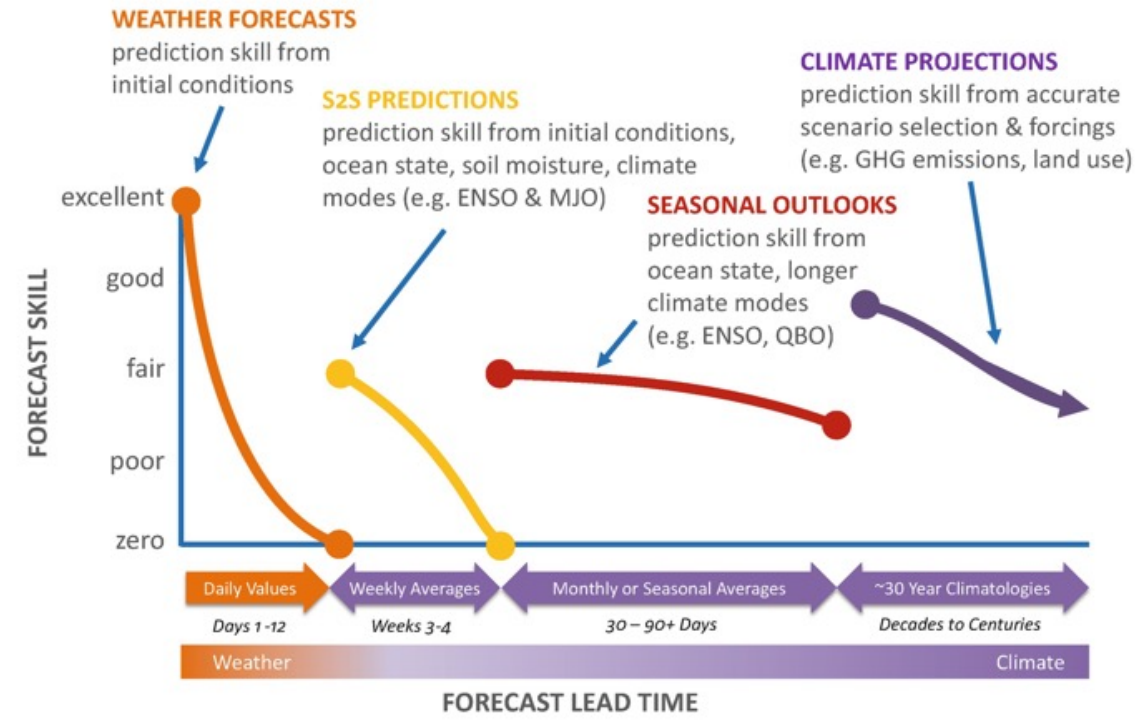
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

EU GREEN WEEK
PARTNER EVENT

VITIGEOSS

Prediction Types, Skill, and Lead Times

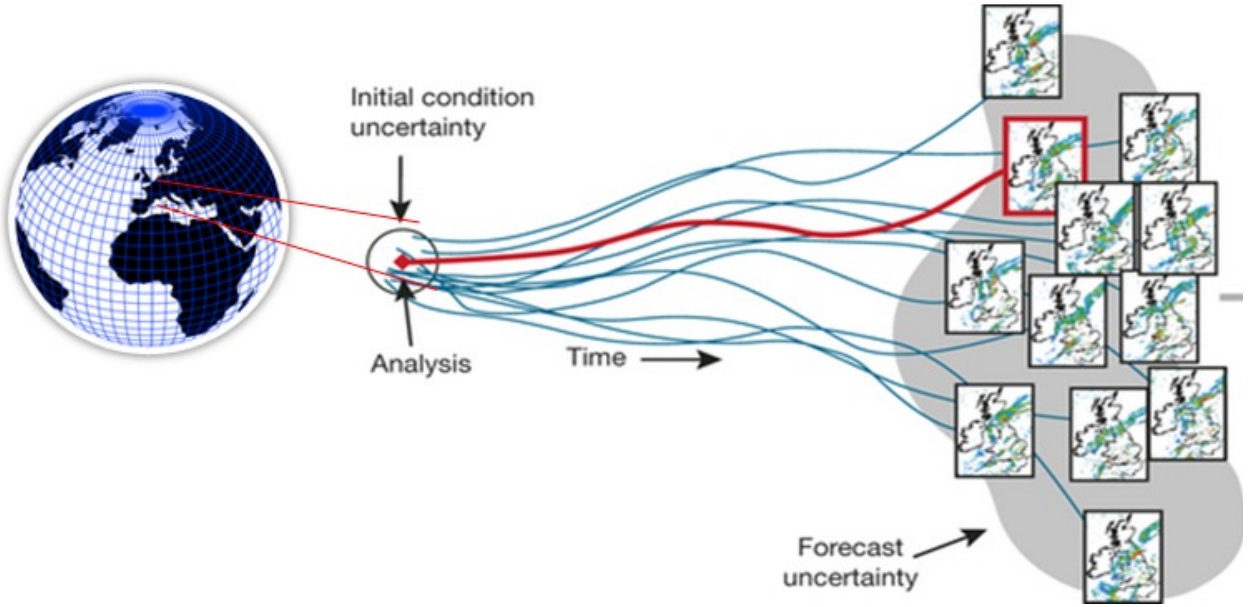


Adapted from iri.columbia.edu/news/qa-subseasonal-prediction-project

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Model simulations



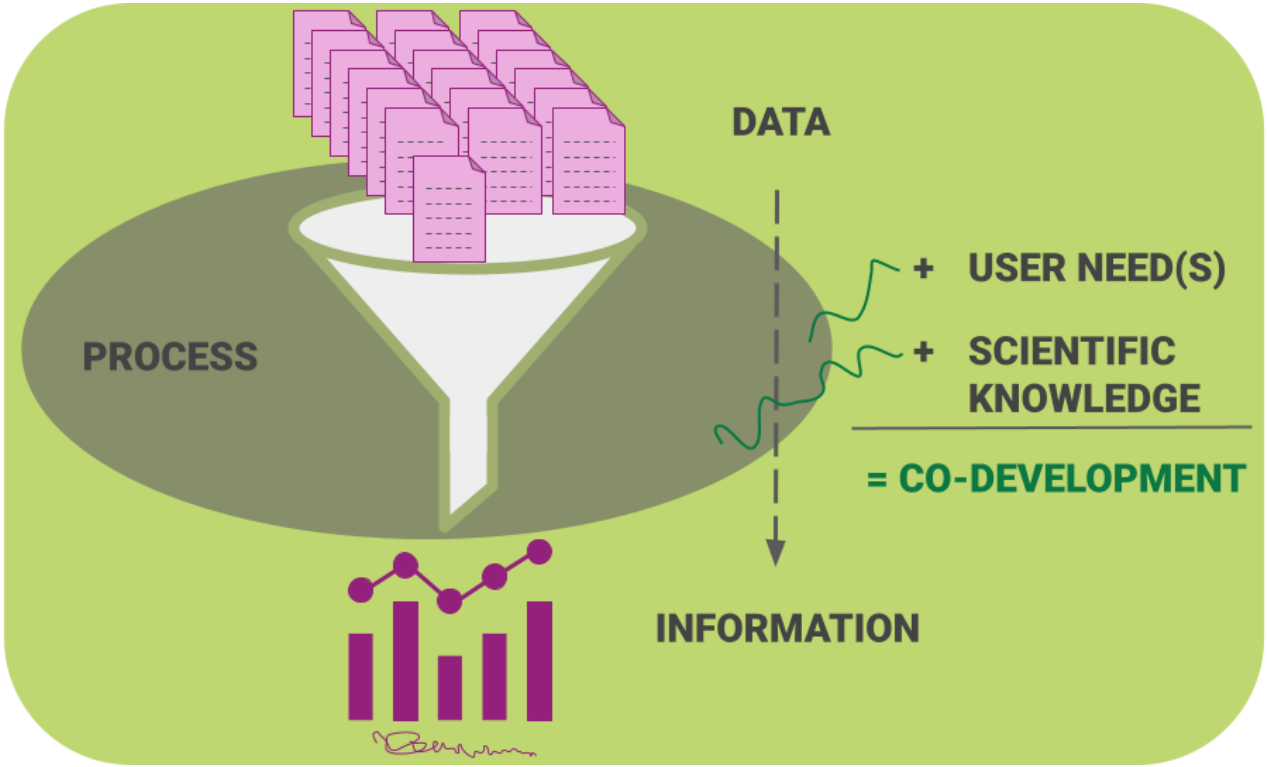
Sub-seasonal forecasts: NCEP CFSv2
Seasonal forecasts: ECMWF SEAS5

EU GREEN WEEK
PARTNER EVENT

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

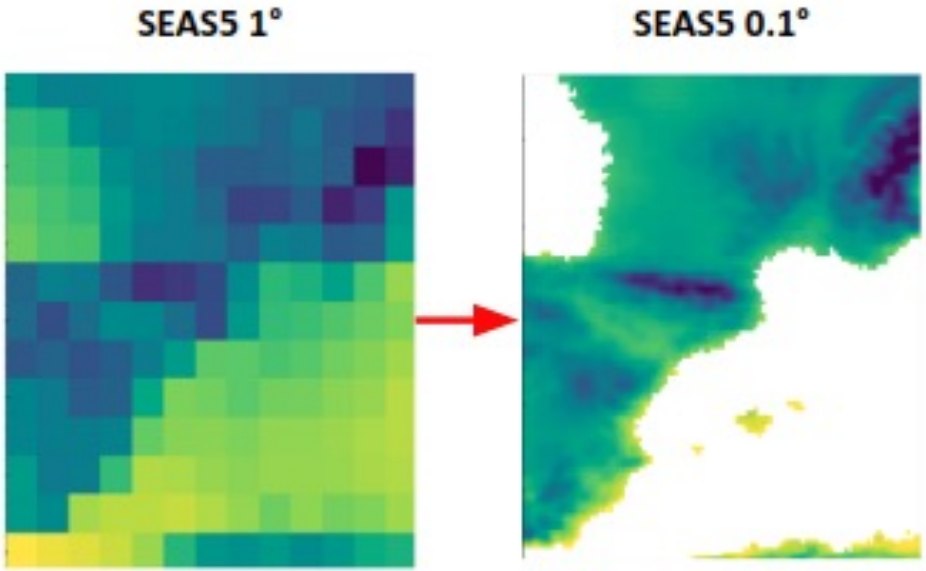
VITIGEOSS



Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

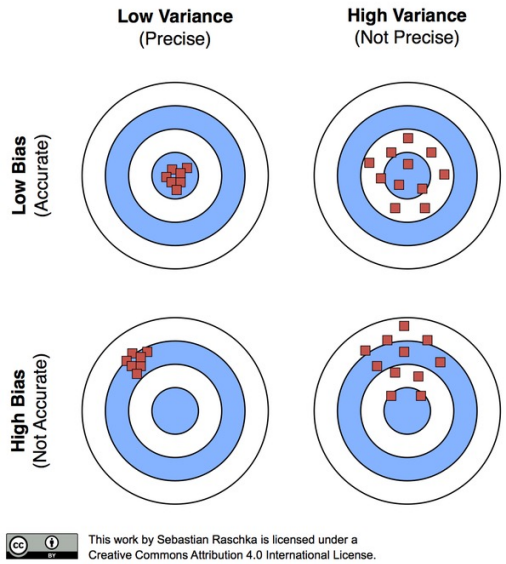
Downscaling



Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Bias adjustment



This work by Sebastian Raschka is licensed under a
Creative Commons Attribution 4.0 International License.

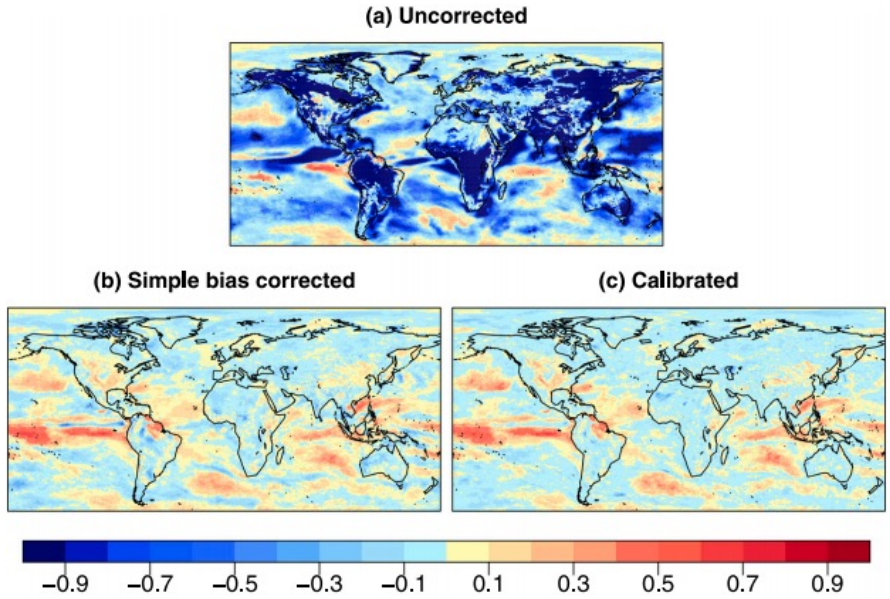


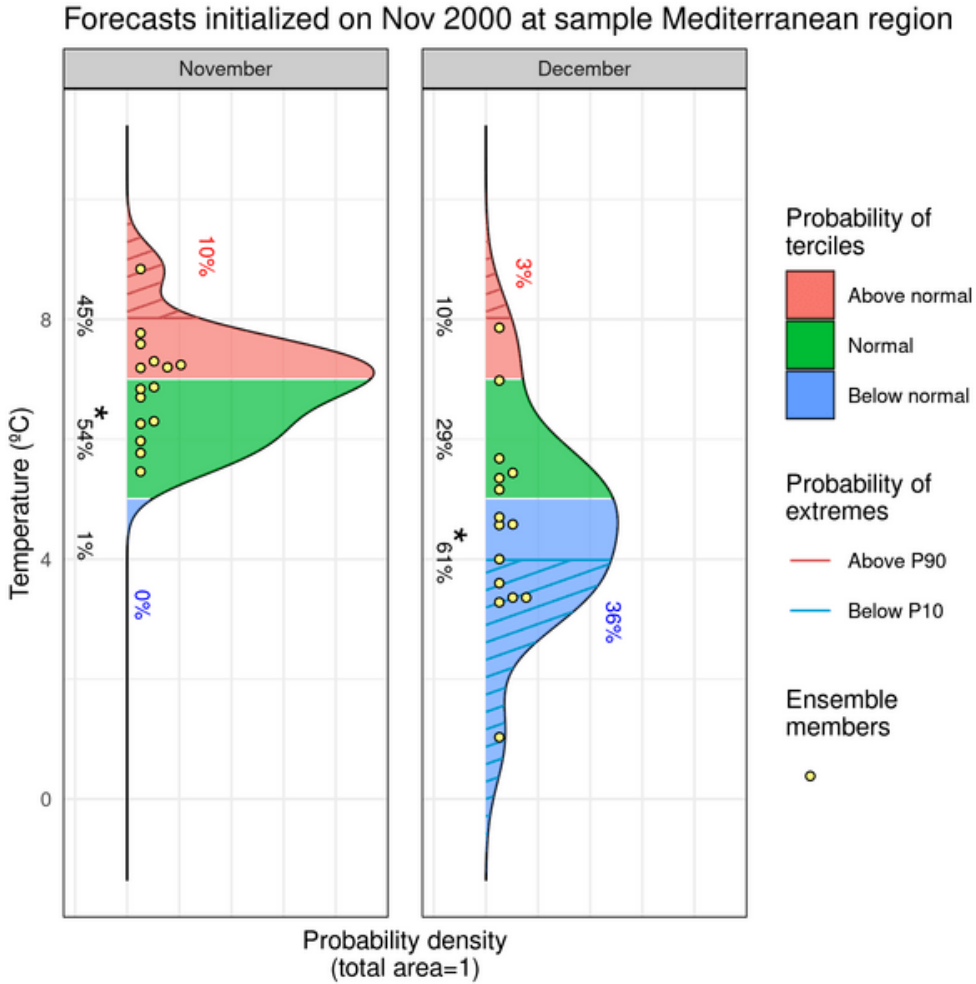
FIG. 4. Fair RPSS for tercile events of 10-m wind speed forecasts from ECMWF System 4 and ERA-Interim reanalysis in winter (DJF). These predictions have been initialized on 1 Nov for the period of 1981–2012.

EU GREEN WEEK
PARTNER EVENT

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Probabilities



EU GREEN WEEK
PARTNER EVENT

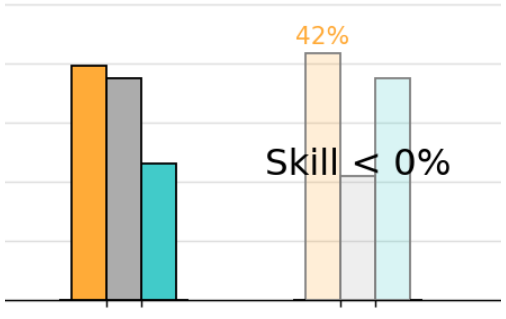
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Forecasts skill

Observations	Re-forecast (Hindcast)
August 1993	August 1993
August 1994	August 1994
August 1995	August 1995
August 2016	August 2016

$$SS_{ref} = \frac{A - A_{ref}}{A_{perf} - A_{ref}} \text{ x } 100\%,$$



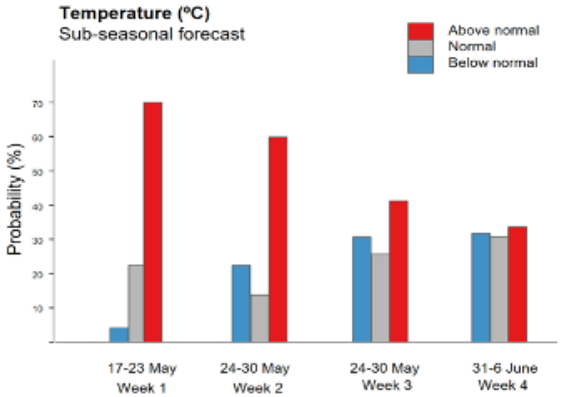
EU GREEN WEEK
PARTNER EVENT

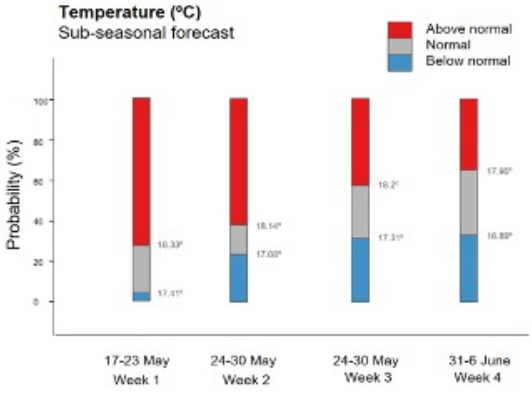
Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

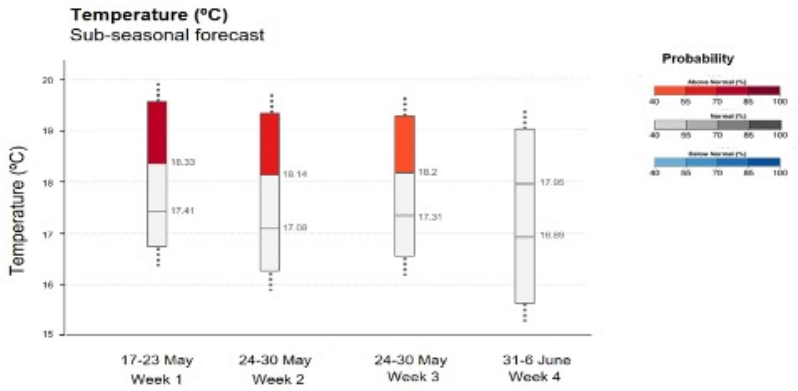
Co-development

Option 1





Option 2



Option 3

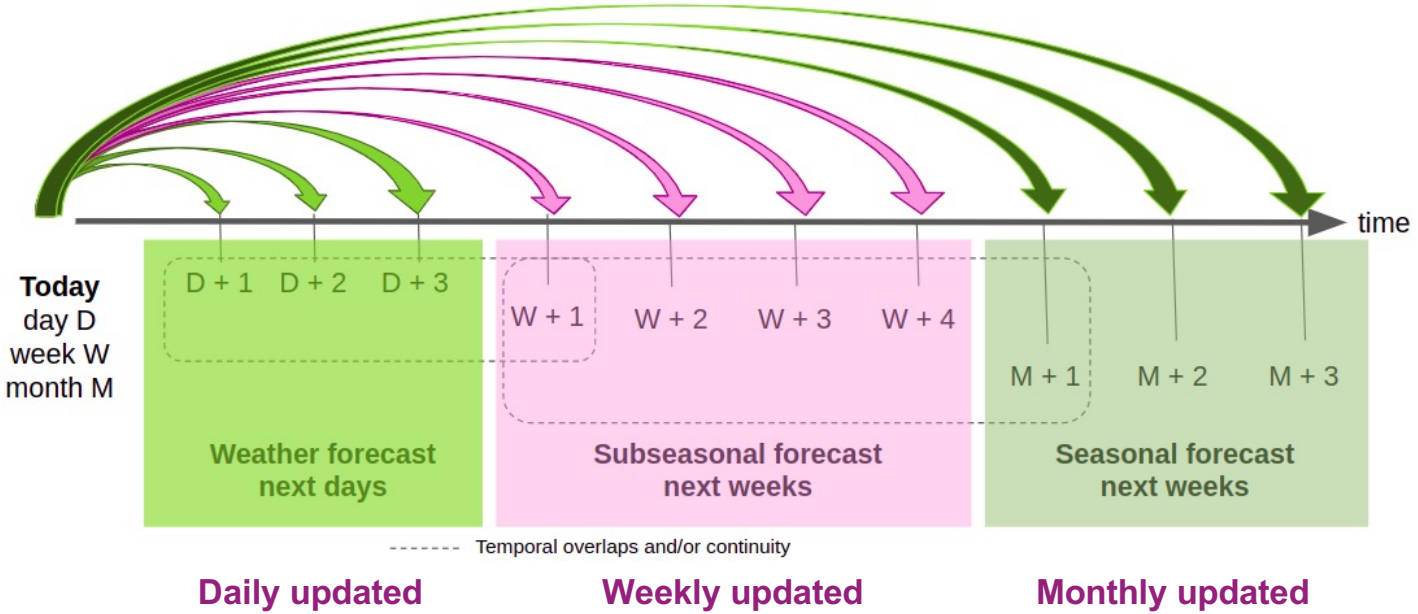
EU GREEN WEEK
PARTNER EVENT

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Summary

VitiGEOSS Weather and Climate Service provided by BSC consists in the:



EU GREEN WEEK
PARTNER EVENT

Barcelona Supercomputing Center
Centro Nacional de Supercomputación

VitiGEOSS project has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.

Thank you!

Questions & Answers

Núria Pérez-Zanón
Researcher
Barcelona Supercomputing Center
nuria.perez@bsc.es

VitiGEOSS has received funding from the European Union's Horizon 2020 research and innovation programme under grant agreement No. 869565.